

The shoulder-joint was approached through a U-shaped incision through the deltoid muscle. The head of the bone was found out of the glenoid cavity. A drill-hole in the anterior surface of the head of the humerus was made allowing a blunt steel hook to be inserted into the bone. Traction was made by the hook outward, aided by pressure of the thumb, this reduced the head of the humerus into the glenoid cavity. The wound was closed in the soft parts, a sterile dressing applied, and the arm held fixed by a plaster-of-Paris dressing around the chest and shoulder. In five weeks the apparatus was removed in the daytime, and worn a short time longer at night only. Union was firm in five weeks.

Eight months after the operation : The motion in the dislocated shoulder is about perfect ; the arm, the patient reports, is as useful as it was before the operation.—*Boston Medical and Surgical Journal*, June 28, 1894.

II. The Histological Consideration of Osteoplasty.

By Dr. BARTH (Marburg). These present considerations are a continuation of the author's observations published last year, and are based upon sixty-five experiments in osteoplastic operations performed upon animals. These experiments have confirmed the former opinion that detached fragments of bone never retain their vitality when transplanted, but perish, and are substituted by new bone formation. It is therefore of no consequence whether the transplanted bone is from another species of animal or not. It becomes devitalized, and then the new bone forms in its place. Ollier's differentiation between autoplasty, homoplasty, and heteroplasty is therefore without significance, for the method of healing is really the same in all cases. The dead fragment of bone is nothing more than an aseptic porous foreign body, and in the healing it conforms precisely to the laws which govern such. It becomes enveloped and penetrated by young, vascular connective tissue springing from the periosteum and marrow of the surrounding bone, and is thus completely infiltrated with the new tissue-cells. On account of the origin of this tissue from periosteum

and marrow, it is capable of producing bone, and about the end of the first week a layer of bone begins to be deposited on the outer surface, and somewhat later new bone is formed in the old Haversian canals and medullary spaces. By such a continuous deposit of new bone, in the course of months the dead bone becomes entirely replaced by the living. This new deposit is not equally distributed throughout the dead bone. It seems to be more active in the deeper parts of the wound defect than at the surface where the regeneration and deposit of the periosteum seems to encounter some difficulties. On the other hand, resorption seems to take place at some parts, which results not only in a removal of the old but also of the new bone. A sort of rarefaction results, which can be seen with the naked eye. After the process of substitution is completed, the borders of the defect cannot be discovered even microscopically. In the skull the new bone can be macroscopically identified by the flattening of that portion of the bone, and in the cylindrical bones by the porous appearance of the compacta due to widening of the vascular spaces around which the new bone is deposited. In the marrow-bones the new bone-formation begins from the marrow.

The retention of the periosteum upon the surface of the implanted bone has no influence whatever upon the after-course of the healing. On the other hand, the case is a very different one when the periosteum is connected by a sufficient pedicle to the living tissue, as in the osteoplastic skull resection after the Wolff-Wagner method. Here the larger part of the bone retains its vitality, and only in the border of the cut surfaces is found the non-nucleated and necrotic bone-substance. In wounds of the bone the conditions are similar to those after implantation of completely separated pieces, and healing takes place in the same manner. The fragment becomes united to the wounded edges of the bone by a bony callus, and the dead bone becomes gradually replaced by successive layers of new bone deposited about the vascular spaces of the necrotic piece.

The preparations in two cases in which a thin periosteal bone-flap healed, not in the bone wound, but with the bony surface

beneath the skin, showed a very different course. The process of healing in this case should be studied like that of the flaps of skin, periosteum, and bone of König, or the periosteum and bone-flaps of Wolff. The thin plate of bone perishes completely, but such an active reproduction of bone takes place from the periosteum that it is soon doubled in amount. This growth depends upon the osteogenetic layer of the periosteum, which is destroyed by tearing the latter from the bone.

Just as can be done with fresh fragments of bone, dead fragments and other foreign substances can be used to repair a bony defect. It simply requires that a sufficient irritation be caused by the implanted material to excite the formation of the young ossific connective tissue. Defects in the skull can thus be repaired by filling them with macerated pieces of bone. This dead substance becomes quickly permeated by the young tissue, in which new bone is deposited, just as occurs in the transplantation of living bone. The histological observations of Bidder have shown that the same thing occurs when ivory is employed.

The most difficult substance with which to repair such a defect seems to be decalcified bone. It is absorbed so quickly by the growth of young connective tissue that nothing but a mass of ordinary scar-tissue results.

The implanted material must have a certain amount of resistance in order to give rise to bony substitution. It is also important that the foreign body fills the defect as completely as possible. When this is not accomplished, usually nothing but an encapsulation of connective tissue results.

A material which fulfils these indications is sponge. Barth has reported a number of cases of bony defects which he has filled with sponge, sutured the skin over the surface, and obtained the desired result. The sponge is quickly penetrated by a growth of connective tissue, and in a short time the defect is closed with an organic deposit level with the surrounding bone. After three weeks an ossification proceeds from the circumference inward.—*Verhandlungen der deutschen Gesellschaft für Chirurgie*, xxiii Kongress, 1894.